

WHAT IS CLAIMED IS:

1 1. A laminated ultrasonic waveguide comprising at least two stamped
2 pieces of sheet stock which are laminated together to form a laminated ultrasonic
3 waveguide for transferring ultrasonic acoustic energy along a longitudinal axis of the
4 laminated ultrasonic waveguide.

1 2. The laminated ultrasonic waveguide of claim 1, in an ultrasonic
2 surgical instrument having an active tip end-effector which is placed in contact with
3 tissue of a patient to couple ultrasonic energy transferred along the laminated
4 ultrasonic waveguide to the tissue.

1 3. The laminated ultrasonic waveguide of claim 1, wherein the at least
2 two stamped pieces of sheet stock are stamped to form at least one channel extending
3 along the length of the laminated ultrasonic waveguide.

1 4. The laminated ultrasonic waveguide of claim 1, wherein the
2 laminated ultrasonic waveguide defines a connector at a proximal end of the laminated
3 ultrasonic waveguide to transfer ultrasonic energy to the laminated ultrasonic
4 waveguide.

1 5. The laminated ultrasonic waveguide of claim 1, comprising first and
2 second stamped half pieces of sheet stock which are laminated together, wherein each
3 of the stamped first and second half pieces of sheet stock defines half of a cylindrical
4 connector at a proximal end of the laminated ultrasonic waveguide which has threads
5 stamped into an interior surface of each half cylindrical connector, such that the first
6 and second half pieces define a cylindrical connector having threads on the interior
7 surface thereof for providing a threaded connector to the laminated ultrasonic
8 waveguide.

1 6. The laminated ultrasonic waveguide of claim 1, wherein a distal
2 portion of each of the stamped pieces of sheet stock has a longitudinal rib stamped

3 therein extending along the longitudinal axis of the laminated ultrasonic waveguide to
4 provide lateral stiffness for the laminated ultrasonic waveguide.

1 7. The laminated ultrasonic waveguide of claim 1, wherein the
2 ultrasonic waveguide comprises first outer, second inner and third outer stamped
3 pieces of sheet stock which are laminated together, wherein each of the first, second
4 and third stamped pieces of sheet stock defines a portion of a cylindrical connector at a
5 proximal end of the laminated ultrasonic waveguide which has threads stamped into
6 an interior surface of the cylindrical connector, such that the first, second and third
7 stamped pieces define the cylindrical connector having threads stamped into the
8 interior surface of the cylindrical connector for providing a threaded connector to the
9 laminated ultrasonic waveguide.

1 8. The laminated ultrasonic waveguide of claim 7, wherein the first
2 and third outer laminated pieces of sheet stock extend from the proximal end of the
3 ultrasonic waveguide for a portion of the length of the ultrasonic waveguide, and the
4 second inner laminated piece of sheet stock extends for at least a portion of the length
5 of the ultrasonic waveguide.

1 9. The laminated ultrasonic waveguide of claim 8, wherein the second
2 inner laminated piece of sheet stock extends to a distal active tip end of the laminated
3 ultrasonic waveguide.

1 10. The laminated ultrasonic waveguide of claim 9, wherein the second
2 inner laminated piece forms an end-effector at the distal end of the ultrasonic
3 laminated waveguide.

1 11. The ultrasonic waveguide of claim 1, wherein a piece of sheet
2 stock is mounted and secured to longitudinally extending slots in an outer
3 circumference of a separate threaded connector.

1 12. A method of fabricating a laminated ultrasonic waveguide
2 comprising stamping and forming at least two stamped pieces of sheet stock to form
3 parts of the body of the laminated ultrasonic waveguide, and laminating together the at
4 least two stamped pieces of sheet stock to form the body of the laminated ultrasonic
5 waveguide.

1 13. The method of claim 12, further comprising fabricating an
2 ultrasonic surgical instrument comprising an active tip end-effector which is placed in
3 contact with tissue of a patient to couple ultrasonic energy transferred along the
4 longitudinal axis of the laminated ultrasonic waveguide to the tissue.

1 14. The method of claim 12, including stamping the at least two
2 stamped pieces of sheet stock to form at least one channel extending along a length of
3 the laminated ultrasonic waveguide.

1 15. The method of claim 12, further comprising defining a connector at
2 a proximal end of the laminated ultrasonic waveguide to transfer ultrasonic energy to
3 the laminated ultrasonic waveguide.

1 16. The method of claim 12, including stamping and forming first and
2 second half pieces of sheet stock while defining in each of the stamped first and
3 second half pieces of sheet stock half of a cylindrical connector at a proximal end of
4 the laminated ultrasonic waveguide by stamping threads into an interior surface of
5 each half of the cylindrical connector, such that the first and second half pieces define
6 a cylindrical connector having threads on the interior surface thereof for providing a
7 threaded connector to the laminated ultrasonic waveguide.

1 17. The method of claim 12, including stamping and forming a
2 longitudinal rib in a distal portion of each of the stamped pieces of sheet stock which
3 extends along a longitudinal axis of the laminated ultrasonic waveguide to provide
4 lateral stiffness for the laminated ultrasonic waveguide.

1 18. The method of claim 12, including stamping and forming first
2 outer , second inner and third outer stamped pieces of sheet stock while defining in
3 each of the first, second and third stamped pieces of sheet metal a portion of a
4 cylindrical connector at a proximal end of the laminated ultrasonic waveguide by
5 stamping threads into an interior surface of the cylindrical connector, such that the
6 first, second and third stamped pieces define the cylindrical connector having threads
7 stamped into the interior surface of the cylindrical connector for providing a threaded
8 connector to the ultrasonic waveguide.

1 19. The method of fabricating an ultrasonic surgical instrument of
2 claim 17, including stamping and forming the first and third outer laminated pieces of
3 sheet stock to extend from the proximal end of the laminated ultrasonic waveguide for
4 a portion of the length of the laminated ultrasonic waveguide, and stamping and
5 forming the second inner laminated piece of sheet stock to extend for at least a portion
6 of the length of the laminated ultrasonic waveguide.

1 20. The method of claim 19, including forming the second inner
2 laminated piece of sheet stock to extend to a distal tip end of the laminated ultrasonic
3 waveguide.

1 21. The method of claim 20, including stamping and forming the
2 second inner laminated piece with an end-effector tip at the distal end of the laminated
3 ultrasonic waveguide.

1 22. The method of claim 12, including mounting and securing a piece
2 of sheet stock to longitudinally extending slots in an outer circumference of a separate
3 threaded connector.